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cushions the complex tactile figures occur, and between them are the triradii and imperfectly formed cristae. The distribution of the triradii in the monkeys and various races of men has been elaborately plotted, showing among other things, the shifting which accompanies the altered function of the foot.

According to Whipple the cushions are essentially walking pads which are secondarily tactile. The cristae have been designated 'friction ridges' since they have been supposed to allow a firmer grasp. An area of furrowed skin has been found on the prehensile tail of Alouatta (Mycetes). The German writers, however, including Schlaginhaufen, regard the cushions as primarily tactile. The most highly developed pads (the digitals) are the most sensitive; the interdigitals are less sensitive; and the low tarsal and carpal cushions least of all. The sensory functions of the toruli, whether primary or secondary, have been demonstrated by various experiments with compass points.

F. T. L.

Literature of Ichthyology. In the Proceedings of the United States National Museum for 1906, (vol. XXXI) are numerous papers on fishes, most of them relating to the fauna of Japan. Jordan and Starks give an elaborate review of the Japanese flounders and soles, 60 species in all. Jordan and Herre discuss the herring-like fishes, and Jordan and Snyder the killifishes. Jordan and Starks give a record of the fishes collected by Prof. J. F. Abbott at Port Arthur, and Hugh M. Smith and Thomas E. B. Pope record the fishes obtained in Japan by Dr. Hugh M. Smith in 1903. Among these are four new genera, *Tosana, Satsuma, Lysodermus,* and *Lambdopsetta.*

Evermann and Goldsborough describe a new rock-fish, *Sebastodes alexandri,* from California; Evermann and Kendall, a collection of fishes from Argentina; and Evermann and Seale, a collection from the Philippines made by Major Edgar S. Mearns.

In the Proceedings of the United States National Museum for 1907, (vol. XXXII), Jordan and Starks describe a collection of fishes from Santa Catalina Island, California.

Among these are *Germo macropterus,* the yellow-fin Albacore, heretofore known from Japan and Hawaii; *Tetrapterus mitsukurii,* the Marlin-spike fish, heretofore known from Japan; *Lepidopus xantusi,* known from Cape San Lucas; *Chænopsis alepidota,* known from the Gulf of California; and *Luvarus imperialis,* known from the Mediterranean. New species are *Starksia holderi* and *Antennarius avalonis.*

Otohime, a new genus of gurnards (*O. hemisticta*) is described in the same proceedings by Jordan and Starks, from Japan.

In the same Proceedings, Professor John O. Snyder gives a review of the Mullidæ or Surmullets of Japan.

In the Bulletin of the Bureau of Fisheries, vol. XXV, 1905 (issued 1906), are several important papers on the fish-fauna of our island possessions.

The "Fishes of Samoa" by Jordan and Seale contains a list of the species collected on the American island of Tutuila and the German island of Upolu by David Starr Jordan and Vernon Lyman Kellogg in 1902. About 500 species were obtained, 92 of them new to science. Most of the latter are small fishes taken through the use of poison (chloride of lime) in the pools of the reefs. The reef fauna of the islands of Samoa is remarkable for the number of brilliantly colored species. In this paper are twenty-six colored plates of the most strikingly colored of these small reef-fishes, noted since the days of Captain Cook. These plates are from water color sketches by Kako Morita. The origin and purpose of these brilliant hues of coral-reef fishes is one of the most difficult problems in evolution. It is to be noted that these colors are not confined to any one family, but that more than a dozen families of fishes participate in them.

With this paper is a check list of all the species, 1704 in number, now known from the region called *Oceania,* which includes Hawaii, Polynesia, Micronesia, and Melanesia. In all this region the fauna is essentially continuous, except as regards Hawaii. In this separated island group, the genera remain the same as in Polynesia, but the species as a rule are different. This difference is clearly due to the operation of isolation and segregation.

In the same paper is a valuable discussion of the Samoan names of fishes, and the root-words composing them, by Mr. W. E. Safford.

Almost simultaneous with this paper, but apparently with a few weeks priority, is a memoir "Zur Fischfauna der Samoa-Inseln" by Dr. Franz Steindachner, in the "Sitzungsberichte der Kaiserliche Akademie" (1906) in Vienna. Dr. Steindachner describes the species of fishes collected at Apia in Upolu, by Dr. Rechinger. This collection contains 120 species, of which 20 are new. Only one of the new species is contained in the series described by Jordan and Seale. This is *Salarias rechingeri* Steindachner, called *Salarias garmani* by Jordan and Seale. A new genus, *Krœmeria,* is added to the rare family of *Trichonotidœ.*

In the next volume of the Bulletin of the Bureau of Fisheries, (XXVI), Jordan and Seale discuss the "Fishes of the Islands of Luzon and Panay" as represented in a collection made in 1900 by Dr. George A. Lung, Surgeon in the United States Navy. Dr. Lung obtained at Manila and Iloilo, 249 species, of which eighteen are described as new. One of these species, *Rhinogobius lungi* proves identical with an older species *Rhinogobius nebulosus* (Forskål), and *Petroscirtes vulsus* is the young of *Petroscirtes eretes.*

The same rich fauna is discussed in a similar paper which immediately follows the other in the same Bulletin, "Fishes of the Philippine Islands" by Evermann and Seale. This treats of the collection exhibited at the Louisiana Purchase Exhibition, most of it being obtained by Mr. Charles J. Pierson, formerly of Stanford University. In this collection are 296 species, of which 22 are new.

One of these, *Platophrys palad,* should have been referred to the genus *Pseudorhombus* of Bleeker, of which the American genus *Cencylopsetta* seems to be a synonym. Three other species of *Pseudorhombus* are by some slip of the pen referred to *Platophrys.* It may be noted also that *Amia fasciata* (white) is a species quite different from *Amia novemfasciata.*

Under the title of "Fishes of Australia (Sydney, 1906), Mr. David G. Stead, naturalist to the Board of Fisheries for New South Wales, gives a convenient popular account of the food-fishes of Australia, with a useful record of the vernacular names applied to them. This book is very well written, and contains much unpublished material. It should lead to a general descriptive catalogue of the vast fish-fauna of the Australian continent.

In the Bulletin of the Museum of Comparative Zoology, vol. L, 1906, Dr. Charles R. Eastman describes numerous shark's teeth and cetacean bones found in deep sea dredgings of the Albatross.

In the same bulletin (vol. XLVI, 1906), Dr. Charles H. Gilbert describes certain lantern-fishes in the Museum at Cambridge. *Diaphus nocturnus* Poey is described and figured from the type. A new species, *Diaphus garmani,* is described from Cuba.

In the same bulletin (vol. L, 1906), L. J. Cole and Thomas Barbour describe a collection of vertebrates from Yucatan.

There are 45 fishes, *Rhamdia depressa* and *Rhamdia sacrificii* being new. *Jordanella floridæ,* a characteristic species of the Florida everglades, is reported from near Progreso, and the rare species, *Emblemaria atlantica* and *Corvula sanctæ-luciæ,* from the sea near the same town.

In the Anales del Museo Nacional de Buenos Aires, Dr. Fernando

Lahille describes a remarkable new genus of mackerel-like fishes from Argentina under the name of *Chœnogaster holmbergi.* The dorsal and anal fins are provided with finlets; the mouth is very large, and the body is covered with large scales. An allied fish is described by Dr. Lahille from Port Lyttelton, New Zealand, under the name of *Lepidothynnus huttoni.* Both of these are regarded, probably correctly, as related to *Gasterochisma melampus* of New Zealand. Figures of all three of these species are given by Lahille.

In Volume III, of Marine Investigations of South Africa (1905), Dr. J. D. F. Gilchrist, Government Biologist of Cape Colony, describes seventeen new species of fishes found in rather deep water off the Cape of Good Hope. Several of these are most interesting additions to our knowledge of fish-forms.

The Biennial Report of the State Board of Fish Commissioners of California for 1906 contains useful accounts of the trout of California, those of the Sierras by Dr. B. W. Evermann, the others by Dr. D. S. Jordan. The report is edited by Charles A. Vogelsang.

One of the most valuable monographs of a single type of fishes is the magnificent paper entitled, "Chimæroid Fishes and Their Development," by Bashford Dean, published by the Carnegie Institution.

This paper treats especially of the anatomy and development of the California Chimæra called Rat-fish or Elephant-fish, *Chimæra colliei,* as studied in the Hopkins Seaside Laboratory at Pacific Grove in California. The paper contains a record of the other living and fossil species. The final conclusion is that the Chimæroids constitute a highly modified and specialized offshoot from the group of primitive sharks.

In the Transactions of the Zoological Society of London, 1906, Dr. G. A. Boulenger continues his papers on the fresh water fishes of Africa with a memoir on the fishes of Lake Tanganyika.

In the Proceedings of the Royal Academy of Amsterdam, Professor Max Weber discusses the fresh water fauna of New Guinea. He divides these fishes into two groups. The fluviomarine group is derived from the marine fauna of the East Indies. The fluviatile group is derived from the river fauna of Northern Australia. In his view, New Guinea was joined to Australia at a time not later than the Pliocene.

In the Biologia Centrali Americana, published in London (October, 1906), Mr. C. Tate Regan gives an account of the fresh water fishes of Mexico and Central America, a group generously represented in the British Museum. According to Regan, *Eleotris æquidens,* from

Mazatlan, is the same as *Eleotris picta* from farther south. *Dormitator latifrons*, of the Pacific slope, is regarded as different from *Dormitator maculatus* of the Atlantic. The name, *Chonophorus banana*, is used instead of the doubtfully identifiable *Chonophorus* (or *Awaous*) *taiasica*. *Gobius guentheri* is shown to be the same as *Chonophorus transandeanus* and *Awaous nelsoni* may be the same species. *Sicydium multipunctatum* is a new species from Oaxaca. Excellent figures are given of many of the species. In the Annals and Magazine of Natural History, XVIII, 1906, Mr. Regan has numerous papers on fishes. In "Descriptions of Some New Sharks in the British Museum Collection," the Japanese *Orectolobus* is separated from *O. barbatus*, as *Orectolobus japonicus*, and the Japanese Monkfish as *Squatina nebulosa*. This had, however, been earlier named *Squatina japonica* by Bleeker. In another paper in the Proc. Zool. Soc. London for 1906, Mr. Regan discusses the classification of the sharks and rays, proposing a new classification.

The following is Regan's arrangement of the families;

Subclass *Selachii*,
  Series 1. *Trematopnea*,
    Order 1. *Pleuropterygii* (extinct)
      Families, *Cladoselachidæ*.
    Order 2. *Acanthodii* (extinct)
      Families, *Acanthoessidæ*,
        Diplacanthidæ.
    Order 3. *Ichthyotomi* (extinct)
      Families, *Pleuracanthidæ*.
    Order 4. *Euselachii*.
      Suborder, *Pleurotremata*,
        Division, *Notodanoidea*.
          Families, *Chlamydoselachidæ*,
            Hexanchidæ.
        Division, *Galeoidea*,
          Families, *Odontaspididæ*,
            Lamnidæ,
            Orectolobidæ,
            Scylliorhinidæ,
            Carchariidæ.
        Division, *Squaloidei*,
          Families, *Cochliodontidæ* (extinct)
            Hybodontidæ (extinct)
            Cestraciontidæ,

(Heterodontidæ)
Squalidæ,
Squatinidæ.
Suborder 2, *Hypotrema*
  Division, *Narcobatoidei*
    Family, *Torpedinidæ*
  Division, *Batoidei*
    Families, *Rhinobatidæ,*
    Raiidæ,
    Dasybatidæ.
Series II. *Chasmatopnea,*
  Order, *Holocephali,*
    Family, *Pyctodontidæ* (extinct)
    Squaloraiidæ (extinct)
    Myriacanthidæ (extinct)
    Chimæridæ

The principal feature of this arrangement is the grouping together of the Cestraciont and Squaloid sharks as a division corresponding to the Galeoidea. Except for the reduction of some families to a lower rank, and a few changes in names of groups, this corresponds fairly with that adopted by recent American writers.

Under Diagnoses of New Central American Fresh Water Fishes, Mr. Regan describes *Rivulus flabellicauda,* from Costa Rica, *Rivulus godmanni,* from *Guatemala, Pœcilia salvatoris,* from San Salvador, *Xiphophorus strigatus,* from Vera Cruz and Oaxaca, *X. brevis,* from Honduras, *Agonostomus macracanthus* and *A. salvini,* from Guatemala.

In the Anatomischer Anzeiger, Dr. Ulric Dahlgren describes the anatomy of the electric organs on the top of the head in the Electric stargazer, *Astroscopus y-græcum.*

These very interesting organs constitute a new type of electric organs, quite different from those of the torpedoes and other electric fishes.

In the Proceedings of the Academy of Natural Sciences of Philadelphia, Henry W. Fowler describes *Centropomus gabbi* as a new species from San Domingo, and *C. heringi,* from Surinam. He gives a list of the cold-blooded vertebrates obtained about the Florida Keys. Eighty-six species of fishes are recorded, one of them regarded as new. This is *Congrammus moorei,* which seems to the writer a species of *Dactyloscopus,* not evidently different from *Dactyloscopus tridigitatus,* found by him at Key West.

In a paper on "Rare or little known Scombroids, No. 3," Mr. Fowler proposes the new subgenus *Pampanoa* for *Trachinotus glaucus*, distinguished by the falcate fins. *Stromateus brasiliensis* is described as new from Brazil, and *Psenes chapmani*, from the Sargasso Sea.

Mr. Fowler in this and other papers adopts the generic names of Klein, published about 1740, and pre-Linnæan as well as non-binomial. These names, in his view, become available, because Walbaum in 1792 reprinted them all with their diagnoses, although not adopting them or in any way reinforcing them. In the judgment of most writers, a name published before Linnæus does not acquire validity by a reprint without acceptance. This is a matter on which some definite ruling should be made.

If we adopt these names of Klein, *Psallisostomus* will replace *Lepisosteus* or *Lepidosteus*, *Brama* will replace *Abramis*, and *Glaucus Lichia*.

A review of various genera of South American Characins is given by Mr. Fowler, as also series of useful notes on fishes of Pennsylvania.

In the Bulletin of George Washington University, vol. I, 1906, Dr. Theodore Gill tells "the remarkable story of a Greek fish, the Glanis," (*Parasilurus aristotelis*). This species was known to Aristotle, but modern authors have, with a few exceptions, overlooked its existence.

In the Smithsonian Report for 1905, Dr. Theodore Gill gives an interesting review of our knowledge of "Parental Care among Fresh Water Fishes." The literature of this subject is fully discussed.

In the Zoologischer Anzeiger, Dr. L. S. Berg discusses the fishes of Lake Baikal and those of the Amur Basin. He considers *Cottocomephorus* as the type of a distinct family. This is based mainly on the peculiar structure of the caudal vertebræ. The fishes of Turkestan are also listed by the same author.

In the Bulletin of the Académie Impériale des Sciences, L. Berg discusses the lampreys of the Russian Empire.

The species of *Lampetra* or river lamprey in this vast region he reduces to two, *L. fluviatilis* and *L. planeri*. To the former he refers *Lampetra aurea* of Alaska, *L. japonica* of Japan, *L. camtchatica* of Kamchatka and other nominal species.

Lampetra planeri, according to Berg, includes *L. mitsukurii* of Japan and *L. wilderi* of the Eastern United States. This last determination is certainly doubtful.

In the Proc. Zool. Soc. London, Prof. W. B. Benham and W. J. Dunbar describe the skull of a young Ribbon-fish, *Regalecus*, from New Zealand.

In the 24th Annual Report of the Fishery Board for Scotland, Dr. H. C. Williamson describes the small cod-fish, *Gadus minutus* and *Gadus esmarki*, and records two cases of hermaphroditism in the common cod-fish.

The fourth part of the Fishes of Japan by Otaki, Fujita and Higurashi appears with descriptions in English and Japanese and with excellent colored figures of the common 'Tai,' the "national fish" of Japan, (*Pagrus major*), of the Ayu (*Plecoglosmus altivelis*), next to the American Eulachon, the finest of all food-fishes, and other species of interest.

In the Zoological Series of the Field Columbian Museum, Dr. T. H. Bean publishes a catalogue of the Fishes of Bermuda. 261 species are recorded, many of the more rare forms being figured. The new species, previously described in the Proceedings of the Biological Society of Washington, vol. XIX, for 1906, are the following: *Hippocampus brunneus*, (= *H. hudsonius* Jordan & Evermann, not of DeKay), *Holocentrus meeki*, *Eupomacentrus chrysus*, *Iridio decoratus*, *Iridio meyeri*, *Iridio microstomus*, *Cryptotomus crassiceps*, *Monacanthus tuckeri*, *Rhinogobius mowbrayi*, *Labrisomus lentiginosus*, *Antennarius verrucosus*.

In the series of Occasional Papers of the Bernice Pauahi Museum at Honolulu Alvin Seale gives a list of "Fishes of the South Pacific" collected by him in the Marquesas, Tahiti, Solomon Islands, and elsewhere in the South Seas. Numerous new species are described, and illustrated in not very satisfactory fashion by photographs.

In the same series, William A. Bryan describes a few new or rare fishes from Honolulu.

In the Records of the Australian Museum, VI, 1906, Edgar R. Waite gives descriptions of Australian and Tasmanian fishes, and studies in Australian Sharks, with photographs of the egg cases of certain species.

In the Proceedings of the Biological Society of Washington, Hugh M. Smith and Alvin Seale describe a number of species from the Philippines, four species being new.

In the Bulletin of the Michigan Fish Commission, No. 8, Mr. Ellis L. Michael catalogs the fishes of Michigan, with reference to all Michigan notices of each species.

DAVID STARR JORDAN.

Nettling Hairs of the Brown-tail Moth.[1] — It is well known that

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[1] Tyzzer, E. E. The pathology of the brown-tail moth dermatitis. *Journ. of Med. Res.*, vol. 16, pp. 43–64.